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CHINESE OFFENSIVE BALLISTIC MISSILE PROGRAM (U)

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CHINESE OFFENSIVE BALLISTIC MISSILE PROGRAM (U)

Authors: [redacted] EXP 86

FTD-CW-11-01-71

31 MARCH 1972

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PREFACE

(U) [redacted] Republic (CPR) ballistic missile program [redacted] All phases of missile development have been reviewed and evaluated to determine the overall status and direction of the CPR offensive missile programs. Current and projected missiles are then identified, and their capabilities are assessed to help define the CPR strategic threat.

(U) The use of ChiCom, Communist China, and CPR throughout the text refers to the Chinese People's Republic.

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SUMMARY

(U) (S) Since the mid-1950's, the Chinese People's Republic (CPR) has devoted a large portion of their national resources to the development of ballistic missile delivery systems concurrently with the development of nuclear weapons. [redacted]

(S) [redacted]

(S) [redacted]

(S) [redacted]

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SECTION I

MISSILE PROGRAM BACKGROUND AND DEVELOPMENT ASPECTS

1. Introduction

(C) ~~(S)~~ Development and production of ballistic missile systems, no matter how much the basic design may be simplified, require a broad and sophisticated technological, industrial, and manufacturing capability. The CPR has made significant gains in an attempt to broaden the capabilities of the necessary industries and institutes. To supplement lagging capabilities, the CPR is actively engaged in the exploitation of foreign technology.

EXP 31

~~(S)~~

2. Procurement

(C) ~~(S)~~ To supplement industrial requirements, the CPR is actively engaged in foreign trade activities which could be associated with their missile programs. They have been able to purchase relatively strategic materials, usually illicitly through cooperative foreign companies, or have obtained items through international trade fairs and expositions.

~~(S-NFD)~~

(C) ~~(S-NFD)~~ The current CPR policy usually is to buy only that which is considered to be the latest technology, and they indicate an extreme interest in the type of plants or equipment that has been sold to, or is used by, the US.

[redacted]

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[redacted]

(~~S-NFD~~)

[redacted]

(~~S~~) The existence of an extensive, ambitious CPR program to obtain equipment possibly to support a missile development program indicates a theoretically capable program deficient in production support.

3. Technologies

a. Manufacturing

(U) (S) It is difficult to assess with any degree of accuracy the specific types of structural material, manufacturing techniques, machine tools, or testing equipment used in the production of CPR missile systems or major missile subsystems. An analysis of the types of basic manufacturing techniques, facilities, and equipment used in manufacturing missile airframes and rocket engines has indicated the status of the various types of manufacturing technologies which are known to be available to the CPR.

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(U) (S) The Chinese Communists are familiar with and have conducted a considerable amount of research in the various types of metal forming techniques necessary for the fabrication of missile propulsion and airframe components. Ample capability is assumed to exist in the area of casting, forging, and extrusion of missile-related structural and systems component materials.

(U) (S) The CPR currently is able to produce basic types of machinery and equipment for industry, transportation, and conventional military uses. Most of the machine tools produced are of the general purpose type and of relatively simple design. However, some factories are starting to produce small quantities of precision tools. The CPR is still very dependent upon foreign imports for precision, automatic, and specialized equipment.

(U) (S) The CPR has been improving its capability to successfully weld high-strength, temperature-resistant structural materials. Future efforts will probably place emphasis on increasing weld joint efficiency and reliability.

(U) (S) The CPR lags the USSR and western nations by several years in manufacturing aerospace propulsion systems and airframes. Manufacturing deficiencies most likely will cause the Chinese engineers to overdesign, resulting in a weight penalty and a coincident decrease in payload capability.

EXPRI

[redacted]

b. Propulsion

(U) (S) The CPR rocket propulsion technology originated with the scientific and technological agreements signed with the Soviet Union in the mid-1950's. The Soviets supplied initial hardware on which the Chinese probably based their native systems. Based on the limited resources of the economy, the Chinese are probably engaged in a single engine development program. The basic engine would be of the MRBM class. The evolution of larger vehicles; e.g., IRBM and ICBM, would involve uprating and cluster the basic engine to achieve the higher thrust requirements.

(U) (S) It is believed the Chinese are giving major attention to those liquid propellants which are within their present production capabilities.

[redacted]

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[redacted]

(S)

[redacted]

(S)

[redacted]

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(S-NFD) Solid propellant motors for strategic offensive applications are essentially limited to those prepared by the casting process.

(U) (S) Intelligence data on the status of the CPR solid propellant R&D program are lacking. The Chinese have published papers reviewing Western state-of-the-art in solid propellant-related areas. These articles do not represent original work on the part of the authors, but indicate cognizance of Western technological levels.

(U) (S) As the CPR chemical industry improves, they should attain the proficiency required to effectively support a large-scale composite propellant program for long-range applications.

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c. Guidance

(U) ~~(S)~~ The knowledge of general theoretical electronics and machine industry standards existing in the CPR, closely connected in the production of missile guidance systems, is considered to compare favorably with other technologically advanced nations. [redacted]. However, many areas in the field of practical engineering, particularly mass production plants of missile guidance-related equipment, are inferior to other advanced nations.

(U) ~~(S)~~ The CPR is actively involved in importing basic electronic equipment. Scientific and technical groups of Chinese probably have been exploiting these imports in an attempt to improve production standards. These activities are indicative of the lack of sufficient facilities for large volume production.

d. Warheads

(U) ~~(S)~~ Communist China has continued to conduct an active nuclear energy program despite the upheavals caused throughout the country by the Cultural Revolution. [redacted] The most serious effects of the Cultural Revolution which may be experienced probably will be the long term consequenc of disruption to basic industry and the shortage of technical and scientific personnel resulting from the closing of schools and universities.

~~(S-RD-NFD)~~ [redacted]

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(3)

(S-CD-NFD)

5. Missile-Related Operational Activities

(U) (S-NFD) The early assessments of the Chinese ballistic missile programs were critically hampered by the lack of reliable intelligence data.

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SECTION II

CURRENT BALLISTIC MISSILE SYSTEMS DEVELOPMENT

1. Introduction

(C) ~~(S)~~ The assessments of the CPR strategic ballistic missile programs have been based largely on very limited technical intelligence information.

2. MRBM Program

(C) ~~(S)~~ The CPR offensive ballistic missile program was initiated under Soviet tutelage in the mid-to-late 1950's. Although it is well-known that the Soviets agreed to supply the CPR with scientific and technical assistance, the true extent of this aid is unknown. However, an estimate of the level of technology can be derived from several sources.

(C) ~~(S)~~ The Sino-Soviet rift of the early 1960's obviously had an adverse effect on the CPR. The Soviets had become deeply involved in the Chinese industrial complex as well as the advanced aerospace weapons development programs.

~~(S-NFD)~~

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(U) (S-NFD) Possibly related to deployment of ballistic missiles within Communist China was the creation of a new arm of the PLA, the Second Artillery Force, as revealed by earlier CPR press releases. The evidence suggests its function is to direct deployment and operation of strategic missiles, and it is apparently on the same organizational level as the Air Force and Navy.

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The Second Artillery Force continues to be referred to in CPR press releases. Two years is considered to be a normal time interval for training an operational ballistic missile unit.

(U) (S) The continuing buildup and relocation of Soviet troops along the Sino-Soviet border have been a matter of great concern to the CPR. The recent border clashes along the Ussuri River in eastern Hi-lung-kiang Province have shown the CPR intends to maintain their position on the disputed border areas. They also have indicated that the Soviet buildup along the northwestern border of Sinkiang Province is a serious provocation in the continuing cold war between the two antagonists. Radio Pei-ching has indicated the people of Sinkiang Province should be prepared for war with the Soviets. The state of agitation existing between the Soviets and the CPR will probably hasten the level of deployment of the CPR MRBM.

(U) (S) The CPR probably have incorporated the same basic transporting-erecting principles as did the Soviets and Germans in support of their earl ballistic missile programs. Included would be equipment similar to a "vidalwagen", a "strabo" (flexible) crane, and a "meilerwagen".

(S)

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(S)

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3. IRBM System

a. IRBM Development Program

(U) (S) Having had access to the design considerations of the Soviet SS-4 during the late 1950's, the CPR no doubt realized the inherent advantages of a storable propellant propulsion system in strategic roles. A consideration of the climatic conditions, transportation facilities, and industrial facilities capable of supporting a storable propellant system makes it reasonable to assume the CPR would pursue such a development program for strategic application.

(U) (S) During 1963, the CPR probably initiated a storable propellant development program requiring the establishment of storable propellant facilities and probably the flight testing of vehicles to evaluate storable propellant technology. This development program essentially formed the technological base for the IRBM.

(S)

(S)

(S)

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(C) (S) The IRBM is assessed to be a single-stage storable liquid propellant vehicle capable of carrying a payload of 4,000 lb to approximate 1,500 NM.

b. System Characteristics

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(S)

(S)

(S)

(1) Summary

(C) (S) A summary of the assessed CPR IRBM characteristics is presented in Table V.

(2) Payload Capability

(C) (S) The payload-range curve was generated for the IRBM based on results of the performance analysis. As illustrated in Figure 18, the assessed IRBM could deliver approximately 4,000 lb to 1,500 NM.

(3) Accuracy

(S)

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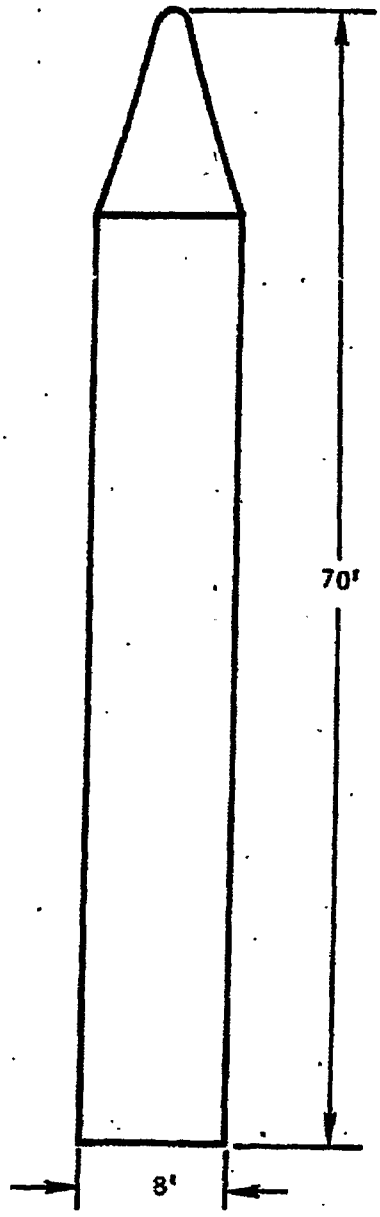
TABLE V

IRBM CHARACTERISTICS (U)



IOC	1972
Max Operational Range (NRE)	1,500 NM
Reentry Vehicle Weight	4,000 lb
[redacted]	
Deployment	Hard
Employment	Strategic Soft Targets

[redacted]

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Configuration	Single Stage
[redacted]	
Guidance	Inertial
[redacted]	
Reentry Vehicle	Sphere-cone

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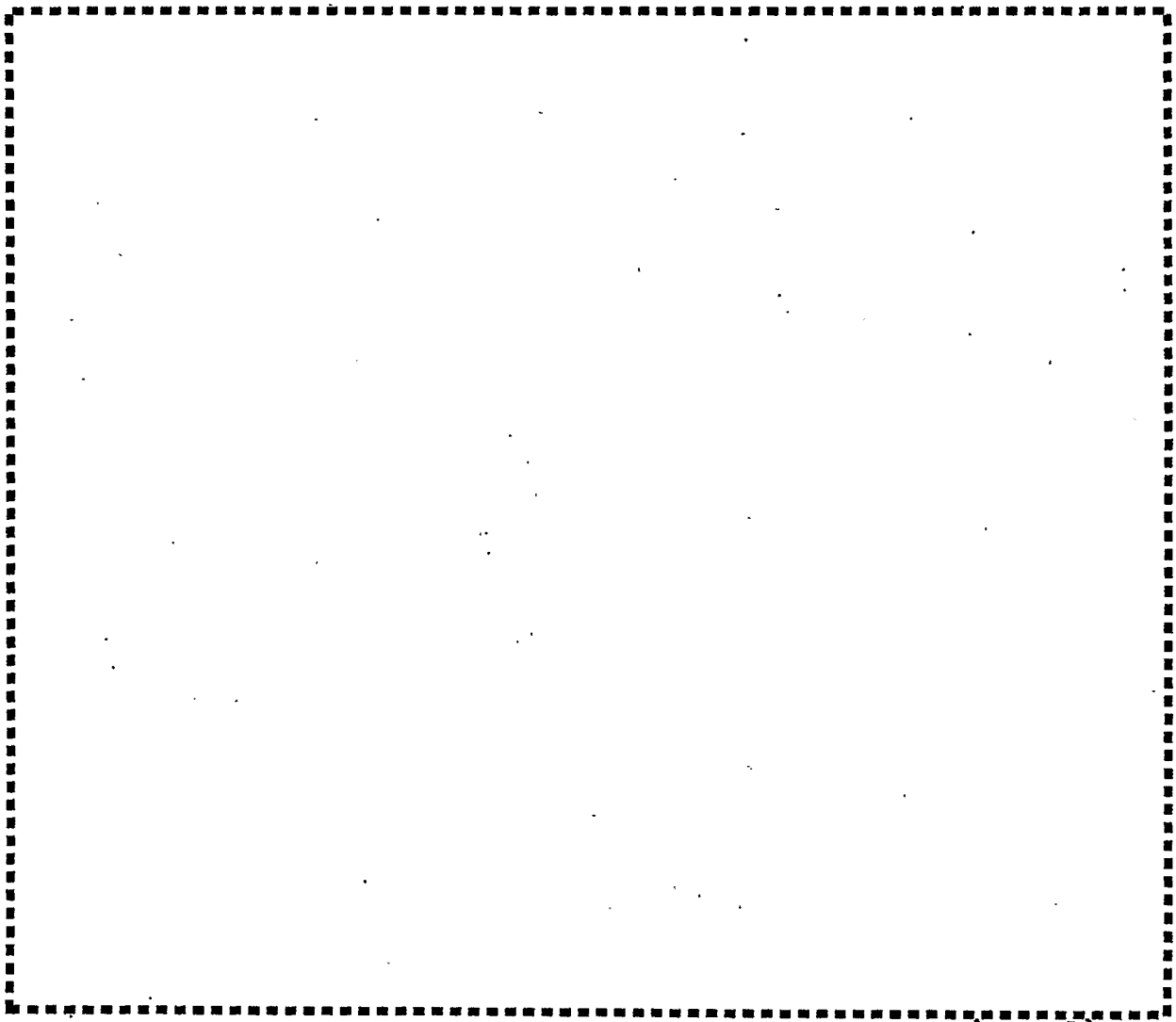

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Fig. 18 IRBM Payload-Range Curve (U)

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(S)

(S)

(S)

TABLE VI

CPR IRBM SYSTEM ACCURACY ESTIMATE* (S)(C)

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(4) Reliability

(C) (S) The absence of flight-test data precludes the formulation of a credible system reliability assessment.

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Type	Reliability at IOC (%)
Alert Rate	80
Launch	85
In-Flight	90
Weapon System	70
Force	60

(C) (S) The following definitions apply to the preceding reliability parameters:

Alert Rate Reliability - The probability of a deployed operational missile system being maintained at a normal readiness condition.

Launch Reliability - The probability of an alert missile system launch as planned with time delays not exceeding a total of 30 min.

In-Flight Reliability - The probability of a launched reentry system arriving as planned within 3.5 CEP of the intended target.

Warhead Reliability - The probability of a delivered warhead detonating in the target area.

Weapon System Reliability - The probability of an alert missile system delivering and detonating a warhead as planned. (It is the product of launch, in-flight, and warhead reliabilities.)

Force Reliability - The probability of the deployed operational missile systems delivering and detonating warheads as planned. (It is the product of alert rate and weapon system reliabilities.)

NOTE: All reliability estimates have been rounded off to the nearest 5%.

(5) Reaction Time

(C) (S) System reaction time will vary significantly between soft and hard deployment. Assuming soft-pad deployment, missile fueling and guidance system adjustments could be performed simultaneously. [redacted] Based on these assumptions, the following reaction times are assessed for the CPR IRBM:

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Condition 3 - Launch crew on alert. Missile in ready building, checked and mated with reentry vehicle. This would probably describe the normal readiness condition. 1-3 hr

Condition 2 - Launch crew at stations. Missile erected on launch pad and ready for propellant loading. Initial guidance alignment and subsystems checkout complete. 15-30 mi

Condition 1 - Launch crew at stations. Propellant loading complete. All systems ready for final check and launch sequence. 5-15 mi

(C) (S) It is not known whether or not the CPR may deploy their strategic systems in hard sites. In this case, the operational IRBM could be stored in a ready-fueled condition for an indefinite period of time. [redacted]

(6) Deployment

(C) (S) To date there is no evidence of CPR IRBM deployment. Historically, and to the present time, the Chinese have favored undergroun emplacement of many types of military systems. [redacted] In any case, the assessed IOC for the IRBM is late 1972.

c. Missile System Description

(C) (S) The CPR IRBM is assessed to be a single-stage missile with the propellant tanks arranged in tandem. The propulsion subsystem is post lated to consist of two main engines and four vernier/control units. The reentry vehicle is assessed to be a sphere-cone.

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(U) (S-NFD)

[redacted]

Table VII presents the total weight distribution of the vehicle.

TABLE VII

IRBM OPERATIONAL WEIGHT BREAKDOWN (U)

[redacted]

~~(SECRET)~~

d. Airborne Subsystems

(1) Guidance and Control Systems

(U) ~~(S)~~ It is likely the CPR will utilize a preprogrammed all-inertial guidance system with thrust magnitude control similar to those utilized by the Soviets. Pure inertial guidance systems are operationally more flexible than radio or radio-inertial systems.

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(2) Propulsion System

(U) (S) [redacted]

It is generally accepted that the GPR had access to both cryog and storable Soviet missile propulsion systems. However, the Soviets supplied only cryogenic strategic systems to the Communist Chinese. The effort involved in the conversion of a cryogenic propulsion system to a storable configuration would essentially amount to a considerable system redesign.

(U) (S) As discussed in Section I, the Chinese have probably chosen to use a member of the hydrazine family as their principle rocket fuel and RFNA as their principal oxidizer. [redacted]

(U) (S) A propulsion subsystem configuration of two engines and turbopumps was assumed, each turbopump servicing two nozzles. Each of the four nozzles would deliver approximately 70,000 lb vacuum thrust. [redacted] A single engine development program would greatly lower developmental efforts and costs as well as provide a higher degree of component standardization.

(U) (S) The assumed propellant weight breakdown, sizing constrain and the resulting propulsion system performance parameters are presented in Table VIII, Table IX, and Table X. [redacted]

(3) [redacted]

(U) (S-RD-NFD) A reentry vehicle sizing computer program was emp! to construct a reentry vehicle around a specified warhead configuration. [redacted]

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TABLE VIII

IRBM PROPELLANT WEIGHT BREAKDOWN (U)

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TABLE IX

CPR IRBM SIZING ASSUMPTIONS (S)(U)

[redacted]

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TABLE X

CPR IRBM PROPULSION SYSTEM PARAMETERS (S)(U)

[redacted]

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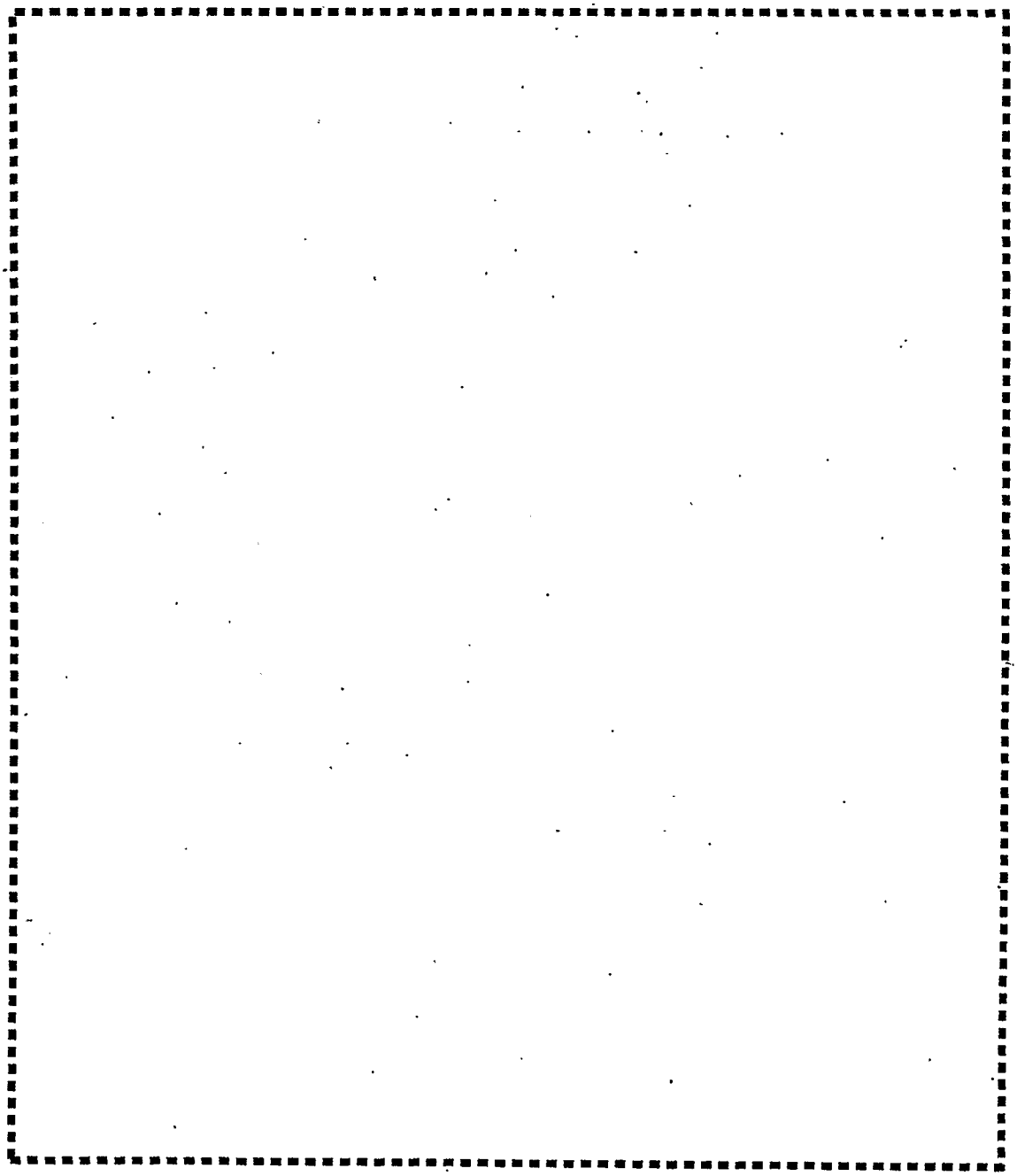

Fig. 19 Possible CPR Reentry Vehicle (S) (U)

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(4) Structural Design

(S) Chinese experience with missile fabrication since the early 1960's and the high national priority which the program enjoys indi that only the most advanced technologies would be applied in the special weapons programs. [redacted]

[redacted]

[redacted]

[redacted]

(U) (S) [redacted]

"roll and weld" technique. In this process, sheet material is cut to a predetermined length, then rolled and welded longitudinally to form the tank barrel. To stiffen the monocoque structure, both longitudinal frame and circumferential (ring) frames are welded to the tank barrel at variou stations along the circumferential axis. End closures (bulkheads) are th welded to each end of the tank barrel, thus forming the oxidizer or fuel tanks.

(U) The unpressurized sections (intertank, thrust section, etc.) are basically fabricated in the same manner as the pressurized sect with the exception that mechanical fasteners (rivets and bolts) are used instead of welding techniques.

(U) Propellant tankage ullage pressure of the vehicle is assumed to be 30 to 40 psi. Ullage factors of 3% for the fuel and 5% for the oxidizer were used in the analysis. Propellant reserve is approximat 1%.

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4. ICBM System

(U) ~~(S)~~ The CPR is believed to have initiated a program for the development of an ICBM weapon system sometime during 1963-1964. While the MRBM and IRBM could be targeted against most of Asia, the acquisition of a full ICBM capability would extend the political and military influence of the Chinese Communists throughout the world. This system could also provide a booster for space applications, a goal adjudged to be of high priority to the propaganda-minded Chinese.

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[redacted]

It should be noted immediately that the vehicle postulated to have launched the CPR satellites would also have a limited ICBM (NATO definition) capability, being able to place credible payloads to ranges between 3,000 NM and 3,500 NM. This will be discussed more fully in the ensuing discussions. To clarify the analysis, both this delivery system and the postulated long-range ICBM are included.

~~(S-NFD)~~ [redacted]

~~(S-NFD)~~ [redacted]

~~(S-NFD)~~ [redacted]

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(U) (S) The early appearance of the MRBM in the CPR offensive missile program, coupled with an absence of ICBM flight-test indicators, suggests than an ICBM program delay has occurred.

(U) (S-NFD) Several plausible conditions have been suggested which could have been contributed to a delay. In one case, there may have been a stat test, launch, or attempted launch of the ICBM booster which pointed out inadequacies in the missile system or launch pad design or perhaps resulte in destruction of a segment of the facility.

(U) (S) An alternate possible explanation may be that technical and/or political problems caused a delay in the program and a vehicle was not available for launch. The nature of a technical delay in this case would impossible to assess due to lack of information.

(U) (S) The CPR, considering yet another possibility, may have decided tc redesign the original vehicle, either based on technical difficulties or actual test results on the pad. This would almost certainly set the enti: program back by at least 2 years.

(S)

(U) (S) The program delay, whatever the cause, presents an anomalous analytical situation, both in estimating the current status of the CPR ICBM program and in assessing the performance of the first ICBM weapon system.

(U) ~~(S)~~ However, it is possible that the true effects of the Cultural Revolution on the ICBM development program were underestimated. The political disruption, coupled with the Maoist philosophy to develop new indigenous technology without copying western approaches, would make the idea of a complete missile redesign a reasonable possibility.

(C) ~~(S)~~ In light of the abundance of missile design and performance data available to the CPR as a result of their successful IRBM program, the CPR probably began attacking the major problems encountered in their early ICBM program.

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(C) ~~(S)~~ Analysis of the event has resulted in a postulated 3.0 meter constant diameter two-stage missile as providing the best data fit. Characteristics of this missile are presented in the following discussion.

(C) ~~(S)~~ In addition, the CPR ICBM program could also encompass the development of a second shorter-range vehicle. This limited-range missile is based on the use of the first two stages of the boost vehicle utilized in the satellite launches; namely, an IRBM vehicle and a second stage sized from the CPR satellite missions. Discussion of this vehicle also follows.

a. System Characteristics - 3.0 Meter Diameter ICBM

(1) Summary

(S) A summary of the assessed CPR ICBM characteristics is presented in Table XI.

(2) Payload Capability

(S) Payload capability for the ICBM is shown in Figure 20. As illustrated, the ICBM could deliver 5,000 lbs to a 6,500 NM (NRE) range.

(3) Accuracy

~~(S)~~

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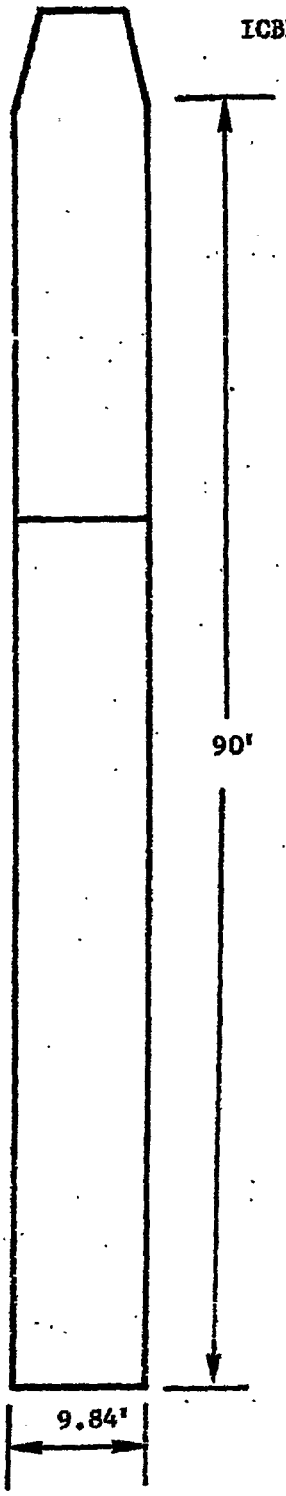
TABLE XI

ICBM CHARACTERISTICS (U)



IOC	1973
Max. Operational Range (NRE)	6,500 NM
Reentry Vehicle Weight	5,000 lb
[redacted]	
Deployment	Soft Site
Employment	Strategic Soft Targets

[redacted]

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Configuration	Two-stage tandem
Gross Lift-off Weight	[redacted]
Sea Level Thrust	
Guidance	All inertial (with possible radio touchup)
Propulsion	First Stage - Three main fixed-position engines with individual turbopumps and four vernier/control units (one turbopump) [redacted]
	Second Stage - One main fixed-position engine with turbopump and four vernier control units [redacted]
Propellants	[redacted]
Burn Time	
Reentry Vehicle	Sphere-cone

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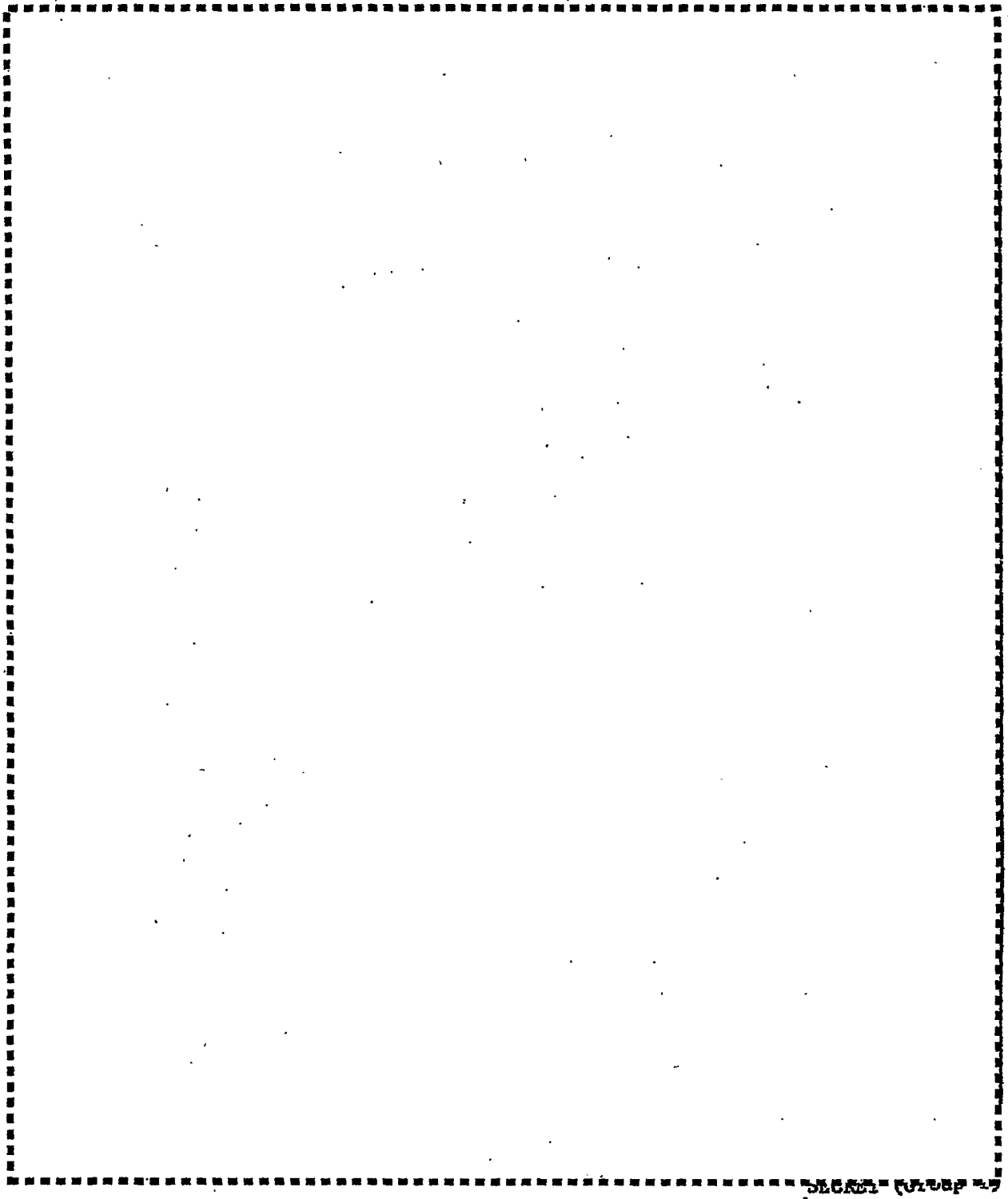

Fig. 20 CPR ICBM Payload vs. Range (S) (C)

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(4) Reliability

(U) (S) The following estimates of CPR weapon system reliability are postulated for the ICBM.

[redacted]

(U) (S) The same reliability definitions used for the IRBM apply to the ICBM reliability parameters.

(5) Reaction Time

(U) (S) Missile fueling and guidance system adjustments could be performed simultaneously. [redacted] Reaction time for the various alert conditions are the same as those used for the IRBM.

(6) Deployment

(U) (S) There is no evidence of CPR ICBM deployment. The postulated CPR ICBM could achieve IOC by 1973.

(7) Mode of Operation - Flight Test

(U) (S) [redacted]. A large assembly and checkout facility will be required to support final assembly, such as fairing installation and checkout procedures. The stages may be mated during this operation or separately transported to the launch pad and mated there.

[redacted] (S-NFD)

EXPOSI

b. Missile System Description

(U) ~~(S)~~ The ICBM is postulated to be 3.0 meter constant diameter two-stage tandem missile. Length of the missile excluding a reentry vehicle is 90 ft. Vehicle weight distribution for the ICBM is presented in Table XII.

TABLE XII

CPR ICBM WEIGHT BREAKDOWN

[redacted]

~~(SECRET)~~(U)

c. Airborne Subsystems

(1) Guidance and Control Systems

(U) ~~(S)~~ The guidance technique employed on the initial ICBM will probably be a programmed all-inertial guidance system. Involved will be the use of thrust magnitude control similar to that used by the Soviets. The CPR state-of-the-art in production of control and guidance devices appears to be sufficient to meet their requirements.

(2) Propulsion System

(U) ~~(S)~~ To date, no data have been obtained which would technica describe the CPR native-designed propulsion systems used for the IRBM and ICBM. [redacted]

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(U) ~~(S)~~ The ICBM first stage is assessed to have a cluster of three main fixed-position engines with individual turbopumps and two thrust chambers each and four vernier/control units (one turbopump). The second stage uses one main fixed-position engine with turbopump and one thrust chamber and four vernier/control units.

(U) ~~(S)~~ In the choice of probable propellants, both nitrogen tetroxide and nitric acid are logical oxidizer candidates. Nitrogen tetroxide, in combination with a hydrazine fuel, provides a modest increase in performance over that obtainable with nitric acid. However, considering the more simple handling requirements, prior experience with Soviet technology, and the relative economic advantages of nitric acid, it is likely that the CPR would choose it as an oxidizer.

(3) Reentry Vehicle

~~(S-RD)~~

~~(S)~~

~~(S)~~

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(4) Structural Design

(U) (S) The CPR probably has mastered structural configuration and fabrication techniques similar in state-of-the-art to those of the Soviet SS-7. The same structural material, configurations, and fabricatio techniques described in the IRBM design section are considered applicable to the ICBM.

(U) (S) Propellant tank ullage pressure is assumed to be 30 to 4 psi. Ullage factors of 3% for the fuel tank and 5% for the oxidizer tank were used in the analysis. Propellant reserve of both stages is approxima 1%.

5. IRBM/Reduced-Range ICBM

(U) (S) The continued animosity between the CPR and the Soviet Union and their immediate proximity probably make an effective offensive ballist missile threat against the USSR a prime CPR strategic requirement.

(U) (S) The requirement to target the entire Soviet Union could be satisf by an interim weapon system which may be available now or at least in earl flight test. An IRBM/reduced-range ICBM capability would be provided by utilizing the first two stages of the assessed CPR satellite launch vehicl in the mission of an ICBM. The nomenclature, IRBM/reduced-range ICBM, is employed to describe its capability, yet avoid its misinterpretation as a possible threat to the continental US.

a. System Characteristics

(U) (S) The first stage is assumed to be the postulated CPR IRBM. Vehicle characteristics are basically the same as those described in the IRBM analysis.

(U) (S) Structural assumption are the same as those for the first stage.

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(S)

b. Summary

(U) (S) A summary of the assessed CPR IRBM/reduced-range ICBM characteristics is presented in Table XIII.

(U) (S) The propellant weight breakdown and vehicle weight breakdown are given in Tables XIV and XV.

(U) (S) This two-stage IRBM/reduced-range ICBM would allow the CPR to target any location in the Soviet Union. The IOC of this system, being directly related to the postulated CPR IRBM, could also be achieved as early as 1972 if the CPR should choose to pursue its development.

(U) (~~S-RD-NFD~~ S-FRD) The payload-range capability of this vehicle is shown in Figure 21. The entire USSR could be targeted with this system by choosing appropriate deployment locations within Communist China.

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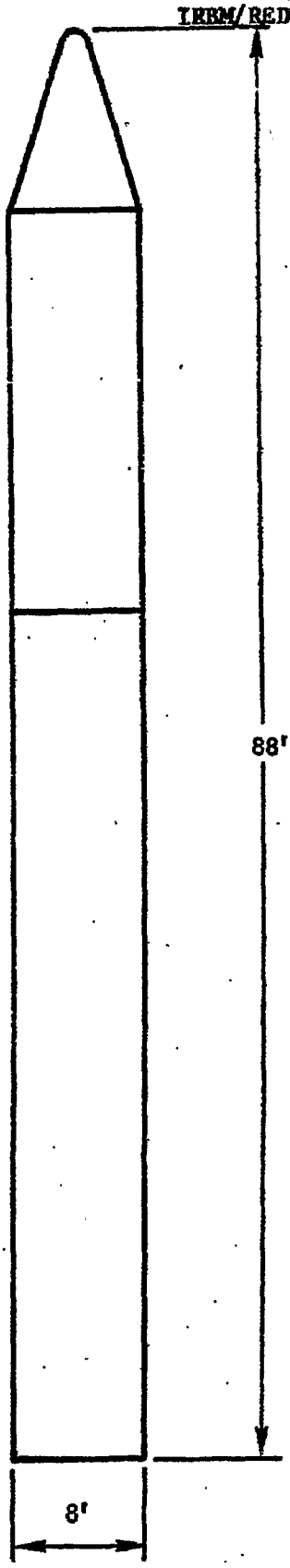
TABLE XIII

IRBM/REDUCED-RANGE ICBM CHARACTERISTICS (U)



IOC (if development pursued)	1972
Max. Operational Range (NRE)	3,200 NM
Reentry Vehicle Weight	4,000 lb
[redacted]	
Deployment	Hard
Employment	Strategic Soft Targets
Configuration	Two Stage
[redacted]	
Guidance	Inertial
Propulsion	First Stage - T main engines with individual t pumps. [redacted] Second Stage - One main engine with two nozzles. [redacted]
Propellants	[redacted]
Burn Time	
Reentry Vehicle	Sphere-Cone

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TABLE XIV

REDUCED-RANGE ICBM PROPELLANT WEIGHT BREAKDOWN (U)

[redacted]

~~(SECRET)~~ (U)

TABLE XV

IRBM/REDUCED-RANGE ICBM OPERATIONAL WEIGHT BREAKDOWN (U)

[redacted]

~~(SECRET)~~ (U)

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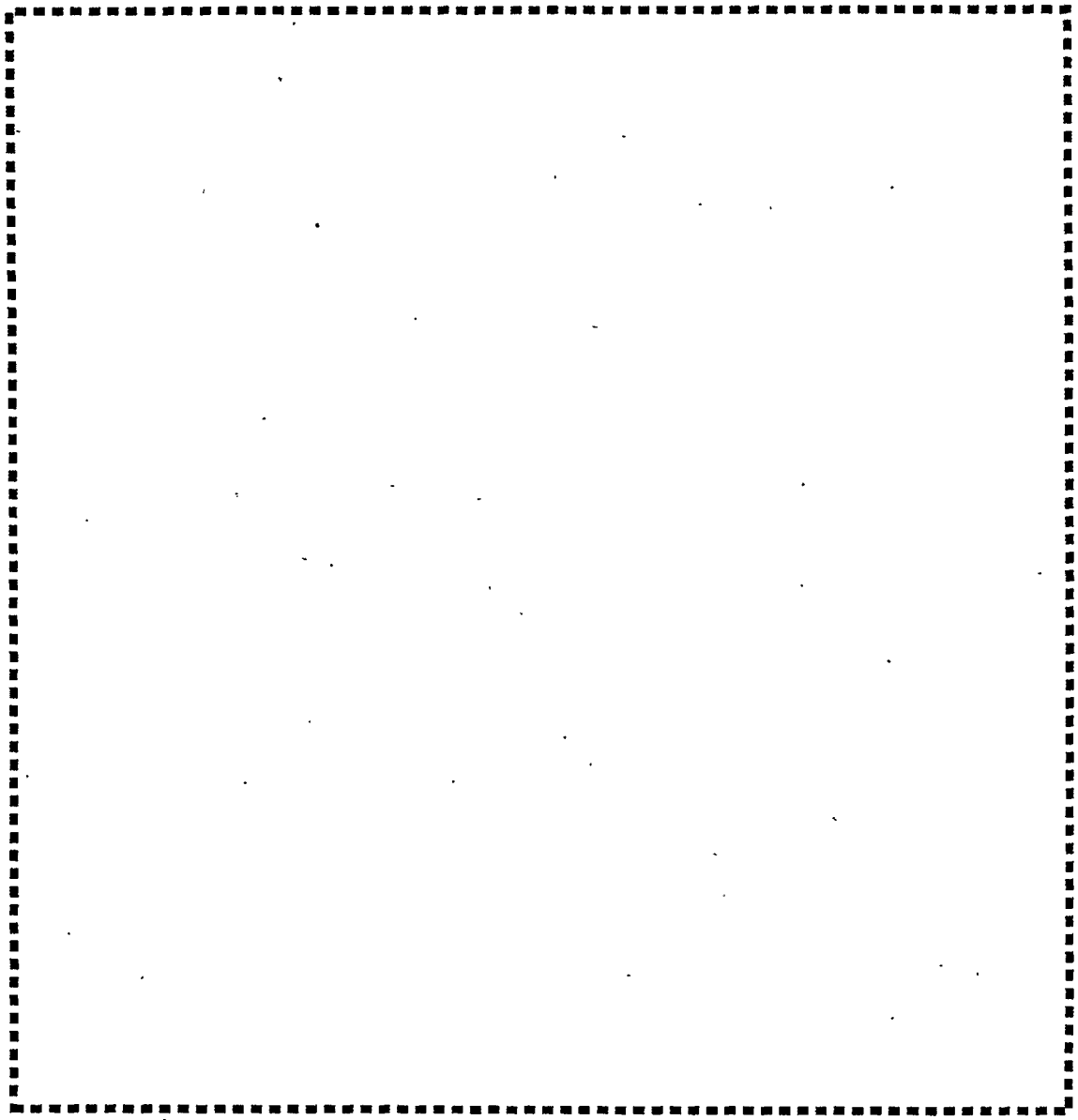

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Fig. 21 Reduced-Range ICBM Payload vs. Range ~~(S)~~ (C)

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SECTION III

PROJECTED MISSILE SYSTEMS DEVELOPMENT

1. Introduction

(U) (S) There is no reason to assume that the CPR will significantly alter the long-range national goal so carefully nurtured through the past 15 years; i.e., to establish Communist China as a world power. To achieve this aim, they have chosen the indigenous development of nuclear weapons and delivery systems rather than through more peaceful economic means. In spite of the continual political upheavals and many diverse internal ideological campaigns, the CPR has achieved notable success in both fields of endeavor.

2. Technology Levels

(U) (S) The inadequacy of data hampering the accurate assessment of the current technological state-of-the-art naturally governs the reliability of a technology forecast. It can be logically assumed that the Chinese will progress in capability from experience with their own programs amplified by continued procurement of foreign-developed technology. The tendency in the past has been to treat Chinese technology ultra-conservatively, even as backward, when applying it to advanced special weapons development. Yet the intelligence community and the world at large continue to be surprised and impressed with each technical advancement, either militarily or otherwise. It would appear that the CPR, at least in a limited fashion, can employ advanced technological expertise in any area which they deem to be of high national priority. This is certainly true of the strategic ballistic missile and nuclear weapons development programs.

[redacted] It is anticipated that this will continue to be the case in the immediate and distant future even though such progress can take place only at the expense of the civilian economy.

3. Strategic Systems

(U) (S) The CPR will continue to favor the development of liquid propellant missile systems in the immediate future. The CSS-1 has long been ready for deployment and may in fact already have been deployed in limited numbers.

[redacted]

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(U) ~~(S)~~ It is likely that the CPR will elect to deploy the IRBM as soon as possible as an interim system to counteract the Soviet border threat. Their first-generation ICBM could become the mainstay of the Chinese strate force until workable solid ballistic systems become feasible. [redacted]

4. Subsystems Development

a. Propulsion

(U) ~~(S-GD-NFD)~~ Solid propellant development is expected to be stressed over the next 10 years. [redacted]

(U) ~~(S)~~ Developmental testing of solid propellant ballistic systems wi probably require about three years from inception, including subscale firings, full-scale static tests, and altitude tests, before the first MR/ IRBM or ICBM flight test could occur. Thus, the first flight test of a solid propellant vehicle is not expected to occur before early 1972. IOC for either system would not occur before 1975 or later. (See Table XVI).

(U) ~~(S)~~ If the CPR is successful in solid propellant development, soli propellant missiles may replace a large part of the first-generation missil force. However, the liquid propellant launch vehicles will probably contin to be employed for space booster purposes, and future CPR strategic plans could include military space missions. Therefore, liquid propellant rocket activities will most likely remain in evidence, reflecting a continu program of new space vehicle modifications and developments.

b. Guidance

(U) ~~(S)~~ CPR open purchases of electronics material have continued over the past year, indicating a requirement to overcome deficiencies in this area. [redacted]

(U) ~~(S)~~ Missile electronics and inertial guidance are probably receivi a great deal of attention. [redacted] Guidance accuracy, while not considered to be critical to the present strategic threat, will become more important to the second-generation systems with a possible aim toward harde target requirements.

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TABLE XVI

POSTULATED CPR SOLID PROPELLANT MISSILE SYSTEMS ~~(S)~~ (U)

[redacted]

~~(SECRET)~~

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c. Reentry Vehicles

(U) (S) CPR reentry vehicle performance can only be estimated from early US and Soviet reentry vehicle systems. The rapid growth of ABM defenses by both world powers will force the Chinese to develop protective measures to maintain a credible threat. At a minimum, radiation and shock hardening will be a necessity. It is probable that research in this direction is already in progress.

d. Penetration Aids

(U) (S) The US and USSR ABM systems will also lead the CPR to consider pen aid development. Initial attempts will probably include simple exoatmospheric techniques such as reflector darts or balloons. The development of more complex exoatmospheric and endoatmospheric pen aid devices; i.e., chaff systems, ECM, or reentry decoys, is not anticipated before the 1975 time period.

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5. Deployment

(U) (S) Because the CPR cannot hope to achieve parity with the US or Soviet Union in the 1970-1980 time period, they will probably utilize all possible protective measures for their deployed systems. Deployment of MRBM will probably be at well-disguised soft sites. The likelihood of detection of these systems will be greatly decreased by their relative simplicity, minimal support requirements, and relative mobility.

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13. ABSTRACT

(U) ~~(S)~~ This working paper presents an analysis of the Chinese People's Republic (CPR) ballistic missile program from its inception in the mid-1950's to the present. All phases of missile development have been reviewed and evaluated to determine the overall status and direction of the CPR offensive missile programs. Current and projected missiles are then identified, and their capabilities are assessed to help define the CPR strategic threat.

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